

AMENDMENTS TO THE CLAIMS:

If entered, this listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-12. (Canceled)

13. (Previously Presented) A semiconductor device package, comprising:

a semiconductor device, said device having been provided with points of electrical contact in an active surface thereof, said points of electrical contact having been provided with fine pitch, high reliability solder bumps, said solder bumps extending from said active surface of said semiconductor device over a height of columns of pillar metal, said columns of pillar metal being in contact with said points of electrical contact provided in the active surface of said semiconductor device wherein said pillar metal comprises two metal layers, and wherein top said metal layer overhangs vertical edges of bottom said metal layer;

15 a Ball Grid Array substrate, said BGA substrate having
been provided with points of electrical contact over a
first and a second surface thereof, said points of BGA
substrate being connected to interconnect lines provided
over the second surface of said BGA substrate;

20 a solder mask provided over said second surface of
said BGA substrate;

 said device being positioned over the second surface
of said BGA substrate, said fine pitch, high reliability
solder bumps facing said second surface of said BGA
25 substrate, providing contact between said fine pitch, high
reliability solder bumps and said points of electrical
contact provided over said second surface of said BGA
substrate;

 electrical contact having been established between
30 said fine pitch, high reliability solder bumps and said
points of electrical contact provided over said second
surface of said BGA substrate by a process of solder
reflow;

 said semiconductor device being encapsulated in a
35 molding compound, said molding compound surrounding said
device on all sides including said active surface of said
device;

 contact balls making electrical contact with said

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points of electrical contact provided over said first
40 surface of said BGA substrate; and
electrical contact having been established between
said solder balls inserted into said solder mask provided
over said first surface of said BGA substrate and said
points of electrical contact provided over said first
45 surface of said BGA substrate by a process of solder
reflow.

14. (Original) The semiconductor device package of claim
13, said solder mask provided over said second surface of
said BGA substrate being removed from said points of
electrical contact provided over the second surface of said
5 BGA substrate by a measurable amount, creating a channel
through which cleaning solution can readily flow.

15. (Original) The semiconductor device package of claim
13, said points of electrical contact provided in an active
surface of said device comprising a peripheral pad design.

16. (Original) The semiconductor device package of claim
13, said points of electrical contact provided in an active
surface of said device comprising a center type pad design.

17. (Original) The semiconductor device package of claim
16, dummy solder bumps having been provided over the active
surface of said device, providing mechanical support for
said device, said dummy solder bumps being provided in
5 addition to said fine pitch, high reliability solder bumps
provided to said points of electrical contact in the active
surface of said device.

18. (Previously Presented) The semiconductor device package
of claim 13, said fine pitch, high reliability solder bumps
provided to said device comprising:

a layer of dielectric deposited over the active
5 surface of said device, openings having been created in
said layer of dielectric in a pattern overlying said points
of electrical contact in an active surface of said device,
exposing the surface of said points of electrical contact
in an active surface of said device;

10 a layer of passivation deposited over the surface of
said layer of dielectric, including the exposed surface of
said points of electrical contact in an active surface of
said device, openings having been created in said layer of
passivation in a pattern overlying said points of

15 electrical contact in an active surface of said device,
exposing the surface of said points of electrical contact
in an active surface of said device;

a layer of metal barrier deposited over the surface of
said layer of passivation, including the exposed surface of
20 said points of electrical contact in an active surface of
said device;

pillar metal and solder bumps overlying said layer of
barrier metal in a pattern overlying said points of
electrical contact in an active surface of said device,
25 said pillar metal and solder bumps being separated by a
layer of under bump metal wherein said under bump metal
overhangs vertical edges of said pillar metal; and

said layer of barrier metal having been etched.

19. (Original) The semiconductor device package of claim
18, said etching said layer of barrier metal having removed
said barrier metal from the surface of said layer of
passivation where said barrier layer is not covered by said
5 pillar metal.

20. (Original) The semiconductor device package of claim
18, said etching said layer of barrier metal having removed

said barrier metal from the surface of said layer of
passivation where said barrier layer is not covered by said
5 pillar metal while further leaving in place said barrier
layer extending from said pillar metal by a measurable
amount.

21. (Original) The semiconductor device package of claim
13, said points of electrical contact in an active surface
of said device having a pitch of about 200 μm or less.

22. (Original) The semiconductor device package of claim
13, flux removal from a gap between said second surface of
said BGA substrate and said active surface of said
semiconductor device having been performed after completion
5 of flip chip assembly and solder reflow.

23. (Original) The semiconductor device package of claim
13, said encapsulation of said semiconductor device in a
molding compound being replaced with an underfill for said
device.

24. (Original) The semiconductor device package of claim
13, said height of columns of pillar metal being between
about 10 and 100 μm and more preferably about 50 μm .